

CLAIMS

What is claimed is:

1. A method for controlling the level of interference on a CDMA network having mobile units in contact with a base station comprising the following steps:

determining the received power of a first signal from each mobile unit;

determining the received power of a second signal from each mobile unit;

5 determining the power ratio of said first signal relative to said second signal;

selecting the lowest power ratio from all of the power ratios determined; and

using said lowest power ratio to scale upwardly the transmit power used to produce said second signal to establish a new transmit power for each mobile unit on the CDMA network.

2. A method for controlling the interference on a CDMA network as set forth in claim 1, wherein each second received signal is lower in power than said first received signal.

3. A method for controlling the interference on a CDMA network as set forth in claim 1, wherein said second received signal is the minimum received signal each unit can use which still meets the signal to noise ratio requirement.

4. A system for controlling the level of interference on a CDMA network having mobile units in contact with a base station comprising:

means for causing said mobile units to send a first signal to said base station;

means for determining the path gain of said first signal;

5 means for delivering the received signal strength of a second signal using the path gain of said first signal;

means for determining the received signal strength of a third signal, lower in power than said second signal, using the path gain of said first signal;

means for using the received signal strength of said first and second signals at said base station for determining a power ratio for each mobile unit;

means for selecting the lowest power ratio; and

means for using said lowest power ratio for scaling upwardly the transmit power each mobile unit used for said second signal to set a new transmit power level for each mobile unit on said CDMA network.

5. A method for controlling the level of interference on a CDMA network as set forth in claim 4, wherein said second signal is lower in power than said first signal.

6. A system for protecting a wireless digital communications network from interference from the use of excessive power by mobile users in active communication with a base station comprising;

means for determining the maximum received power capability of each mobile user at said base station;

means for determining the minimum received power, which is capable of meeting the communications quality requirements of each user with said base station;

means for determining the ratio of maximum received power to minimum received power of each user;

means for determining the lowest user power ratio; and

means for using said lowest user power ratio to scale upwardly the minimum power of each user which scaled power is set as the user operating power by said base station.

7. A system for controlling interference in a CDMA wireless communications network having mobile users in contact with a base station comprising;

means for determining the maximum received power of each active user at said base station;

means for determining the minimum received power each user can use while maintaining an acceptable communications link between said user and said base station;

means for determining the ratio of maximum received power to minimum received power of each of said users and for determining the lowest power ratio used; and

means for using said lowest power ratio to scale upwardly the transmit power of each user that was used to produce the minimum received power at said base station to arrive at a new transmit power for each active user to use in communication with said base station.

8. A CDMA cellular communications network wherein an active mobile user in contact with the base station is operating at a power level determined by multiplying the minimum power that said user can use for quality communication with said base station by a scaling factor determined by the lowest ratio of maximum received power to the minimum received power of all of the users at the base station.

9. A method for reducing the level of interference of a CDMA cellular communications network comprising:

determining the maximum received power of each user of the network at a base station;

determining the minimum received power of each user, which is capable of maintaining quality communication with said base station;

calculating a power ratio for each user by dividing a users maximum received power by the user's minimum received power;

selecting the lowest power ratio to use as a scaling factor; and

multiplying the power level used by each user in determining the minimum received power by said scaling factor to arrive at a new power level for use in communication with said base station.

10. A method for maintaining the communication quality of a wireless digital data network comprising:

determining the maximum receive power from each active network user;

determining the minimum received power which an active network user can use while maintaining quality communication within the frame error rate;

determining the maximum received power to minimum received power ratio of each network user;

scaling upwardly the transmitting power of each user by multiplying the transmit power which produced the minimum received power by the lowest power ratio to produce a new operating power for all users not already operating at the new power level.

11. A method for maintaining the communication quality of a wireless digital data network as set forth in claim 10, wherein the transmitting power of each network user is

controlled at a level determined by a ratio of maximum to minimum received power of the weakest network user.

~~12.~~ A wireless digital communications network wherein the operating power of each user is scaled upwardly by the lowest maximum to minimum received power ratio determined for all of the active network users.

13. A wireless digital communications network as set forth in claim 12, wherein the operating power of each network user is determined by multiplying the power used to produce the minimum received power by the maximum to minimum received power ratio of the weakest user.

~~14.~~ A method for providing active link quality protection while improving capacity in wireless communication systems, comprising the steps of:

for a plurality of active users, recognizing error rate requirement and minimum and maximum transmit power capabilities for each active user;

assigning a first power level to each active user;

assigning a minimum transmit power so each active user's desired error rate is satisfied;

determining the maximum received power possible from any active user;

determining the smallest ratio of peak received power to minimum received power of each active user;

scaling the transmit powers of all active users that was used to produce the minimum received signal by the smallest ratio determined above.

~~15.~~ A method for adjusting power of new and active users and providing active link quality protection and improving capacity in wireless communication systems, through the steps of:

assigning feasible power levels to active users having minimum and maximum transmit power capabilities;

determining the minimum transmit power required by the active users so each user's desired error rate is satisfied;

10 determining the weakest link; that is, the user with smallest ratio of peak received power to minimum received power;

scaling the powers of all active links by a factor less than the optimal as
15 determined by the number of new users to be activated and the resulting new interference that
must be tolerated.

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$$\hat{a} = \frac{\hat{B} + \eta}{\frac{s_i^{\min}}{T_i} - \sum_{j \neq i} s_j^{\min}}$$